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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/754,325	01/05/2001	Tomohiro Yamashita	201540US2	3684

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EXAMINER

NADAV, ORI

ART UNIT

PAPER NUMBER

2811

DATE MAILED: 07/25/2002

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/754,325

Applicant(s)

YAMASHITA ET AL.

Examiner

ori nadav

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period of Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 30 March 2001.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-10 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-10 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 05 January 2001 is/are: a) ☐ accepted or b) ☒ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____
- 4) ☐ Interview Summary (PTO-413) Paper No(s). _____
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____

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DETAILED ACTION

Oath/Declaration

1. The oath/declaration filed on 01/05/2000 is acceptable.

Drawings

2. The drawings are objected to because figures 22-32 should be designated by a legend such as --Prior Art-- because only that which is old is illustrated. See MPEP § 608.02(g). Correction is required.

3. The drawings are objected to as failing to comply with 37 CFR 1.84(p)(5) because figure 1 does not include reference sign "70S" mentioned on page 13, line 15 of the description: . A proposed drawing correction or corrected drawings are required in reply to the Office action to avoid abandonment of the application. The objection to the drawings will not be held in abeyance.

Priority

4. Receipt is acknowledged of papers submitted under 35 U.S.C. 119(a)-(d), which papers have been placed of record in the file.

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Information Disclosure Statement

5. The Information Disclosure Statement filed on 3/30/2001 has been considered. Applicant did not wish to make of record, the related cases filed, on form PTO-1449.

Specification

6. The disclosure is objected to because of the following informalities: On page 2, line 14, "51B" should read "51BP".

Appropriate correction is required.

Claim Rejections - 35 USC § 102

7. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless --

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

(e) the invention was described in a patent granted on an application for patent by another filed in the United States before the invention thereof by the applicant for patent, or on an international application by another who has fulfilled the requirements of paragraphs (1), (2), and (4) of section 371© of this title before the invention thereof by the applicant for patent.

8. Claims 1 and 5-9 are rejected under 35 U.S.C. 102(b) as being anticipated by Wei et al. (5,843,813).

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Regarding claim 1, Wei et al. teach in figure 10B and related text (column 10, line 20 to column 11, line 12) a semiconductor device comprising: semiconductor substrate 240; first well 274 of a prescribed conductivity type selectively formed in a surface of the semiconductor substrate; a second well 264 of the same conductivity type as the prescribed conductivity type selectively formed in the surface of the semiconductor substrate; a first conductive layer 246 across the first well and the second well in the surface of the semiconductor substrate with an end provided on the first well 274 and another end provided on the second well 264, formed by lowering the resistivity of the surface; and a first contact 280 electrically connected with the first well 274.

Regarding claim 5, Wei et al. teach in figure 10B and related text (column 10, line 20 to column 11, line 12) a second conductive layer 276 formed in the surface of the semiconductor substrate by lowering the resistivity of the surface and provided on the first well 274 without being in contact with the second well 264, wherein the first contact 280 is in contact with the second conductive layer 276.

Regarding claim 6, Wei et al. teach in figure 10B a first conductive layer 246 includes an impurity introduction layer N⁺ of the same conductivity type as the prescribed conductivity type N. Note that the broad recitation of the claim does not require the first conductive layer to include both an impurity introduction layer of the same conductivity

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type as the prescribed conductivity type and a compound layer of the material for the semiconductor substrate and a metal, but only one of an impurity introduction layer of the same conductivity type as the prescribed conductivity type and a compound layer of the material for the semiconductor substrate and a metal.

Regarding claim 7, Wei et al. teach in figure 10B a first conductive layer 246 has lower resistivity (N+) than the first well (N) and the second well (N).

Regarding claim 8, Wei et al. teach in figure 10B a second conductive layer 276 includes an impurity introduction layer N+ of the same conductivity type as the prescribed conductivity type N

Regarding claim 9, Wei et al. teach in figure 10B a second conductive layer 276 has lower resistivity (N+) than the first well (N).

9. Claims 1 and 10 are rejected under 35 U.S.C. 102(e) as being anticipated by Nishigohri (6,384,455).

Regarding claim 1, Nishigohri teaches in figure 16 and related text (column 6, line 61 to column 9, line 10) a semiconductor device comprising: semiconductor substrate 21, first well 41 of a prescribed conductivity type selectively formed in a surface of the

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semiconductor substrate; a second well 31 (column 9, lines 5-7) of the same conductivity type as the prescribed conductivity type selectively formed in the surface of the semiconductor substrate; a first conductive layer 36 (column 9, lines 21-24) across the first well and the second well in the surface of the semiconductor substrate with an end provided on the first well 41 and another end provided on the second well 31, formed by lowering the resistivity of the surface; and a first contact 38 electrically connected with the first well 41.

Regarding claim 10, Nishigohri teaches in figure 16 and related text (column 8, line 63 to column 9, line 4) the first well 41 and the second well 31 have different impurity profiles.

Claim Rejections - 35 USC § 103

10. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which the subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

11. Claims 1-4 are rejected under 35 U.S.C. 103(a) as being unpatentable Kikuda et al. (5,519,243) in view of Wolf (Silicon processing for the VLSI era, Vol. 3, page 523).

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Regarding claim 1, Kikuda et al. teach in figure 3 and related text (column 10, line 20 to column 11, line 12) a semiconductor device comprising: semiconductor substrate 2; first well 4 of a prescribed conductivity type formed in a surface of the semiconductor substrate; a second well 33 of the same conductivity type as the prescribed conductivity type formed in the surface of the semiconductor substrate; a first conductive layer 6 (a well is a conductive layer) across the first well and the second well in the surface of the semiconductor substrate with an end provided on the first well 4 and another end provided on the second well 33; and a first contact 280 electrically connected with the first well 274.

Kikuda et al. do not teach forming the first conductive layer (p well 6) by lowering the resistivity of substrate's surface, and selectively forming the first and second wells.

Wolf teaches that it is conventional to form a well by diffusing or implanting excess dopants into the substrate (page 523, lines 7-13). Excess dopants would lower the resistivity of substrate's surface. It would have been obvious to a person of ordinary skill in the art at the time the invention was made to form the first conductive layer (p well 6) of Kikuda et al. by lowering the resistivity of substrate's surface, as taught by Wolf, in order to simplify the processing steps of making the device by forming the well in a well known method. The combination is motivated by the teachings of Kikuda who forms wells by ion implantation (column 5, lines 34-50).

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Regarding the limitations of selectively forming the first and second wells, these are process limitations which would not carry patentable weight in this claim drawn to a structure, because distinct structure is not necessarily produced. Note that a "product by process" claim is directed to the product per se, no matter how actually made, In re Hirao, 190 USPQ 15 at 17 (footnote 3). See also In re Brown, 173 USPQ 685; In re Luck, 177 USPQ 523; In re Fessmann, 180 USPQ 324; In re Avery, 186 USPQ 161; In re Wertheim, 191 USPQ 90 (209 USPQ 554 does not deal with this issue); and In re Marosi et al., 218 USPQ 289, all of which make it clear that it is the patentability of the final product per se which must be determined in a "product by process" claim, and not the patentability of the process, and that an old or obvious product produced by a new method is not patentable as a product, whether claimed in "product by process" claims or not. Note that the applicant has the burden of proof in such cases, as the above case law makes clear.

Regarding claims 2-4, Kikuda et al. teach in figure 3 a first contact (the right N⁺ diffusion region) and a second contact 12 being in contact with the first conductive layer 6, wherein the first contact is arranged in opposition to the first well 4 through the first conductive layer 6 while the second contact 12 is arranged in opposition to the second well 33 through the first conductive layer 6.

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Conclusion

12. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. References D-H and N are cited as being related to conductive layers being across conductive wells.

Papers related to this application may be submitted to Technology center (TC) 2800 by facsimile transmission. Papers should be faxed to TC 2800 via the TC 2800 Fax center located in Crystal Plaza 4, room 4-C23. The faxing of such papers must conform with the notice published in the Official Gazette, 1096 OG 30 (November 15, 1989). The Group 2811 Fax Center number is (703) 308-7722 and 308-7724. The Group 2811 Fax Center is to be used only for papers related to Group 2811 applications.

Any inquiry concerning this communication or any earlier communication from the Examiner should be directed to *Examiner Nadav* whose telephone number is **(703) 308-8138**. The Examiner is in the Office generally between the hours of 7 AM to 4 PM (Eastern Standard Time) Monday through Friday. If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Tom Thomas, can be reached at **(703) 308-2772**.

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Any inquiry of a general nature or relating to the status of this application should be directed to the **Technology Center Receptionists** whose telephone number is **308-0956**

A handwritten signature in black ink, appearing to read 'Ori Nadav', with a stylized, elongated flourish extending to the right.

Ori Nadav

July 22, 2002